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A Comparative Study On Efficacy Of Intrathecal Ropivacaine Heavy With Dexmedetomidine And Intrathecal Bupivacaine Heavy With Dexmedetomidine In Lower Abdominal And Lower Limb Surgeries

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I. Introduction:

Spinal anaesthesia is the most commonly used technique for lower abdominal and lower limb surgeries as it is very economical and easy to administer. However, postoperative pain control is a major problem because spinal anesthesia using only local anesthetics is associated with relatively short duration of action, and thus early analgesic intervention is needed in the postoperative period.

Used alone in spinal anaesthesia, hyperbaric bupivacaine 0.5% and ropivacaine 0.75% is associated with relatively short duration of action leading to the need to rescue with general anaesthesia if the surgical procedure exceeds beyond the drug's duration of action. Ropivacaine is the first enantiomer specific compound of bupivacaine with better recovery of motor function and a reduced risk of cardiotoxicity and neurotoxicity,but post-operative pain relief is an important issue with ropivacaine. This necessitates using an adjuvant drug with ropivacaine for better intraoperative hemodynamic conditions along with optimal post-operative analgesia, while having minimal side effects.

Dexmedetomidine, a highly selective α_2 agonist is rapidly emerging as the choice of additive to spinal anaesthesia in view of its property to provide analgesia and awake sedation without respiratory depression along with a stable hemodynamics.

II. Aim:

To Compare the Efficacy of Intrathecal Ropivacaine heavy with Dexmedetomidine and Intrathecal Bupivacaine heavy with Dexmedetomidine in lower abdominal and lower limb surgeries

III. Objectives Of The Study:

- To compare the Onset and Duration of sensory and motor blockade of intrathecal Ropivacaine heavy with Dexmedetomidine and intrathecal Bupivacaine heavy with Dexmedetomidine.
- To compare hemodynamic variability in both the groups
- To compare the duration of sensory and motor blockade in both the groups
- To compare the duration of analgesia and time of rescue analgesia in both the groups
- To compare side effects if any in both the groups

IV. Subject & Methods:

Study Design: Observational Comparative study

Study Area: Department of Anaesthesiology and critical care, Saraswathi Institute of Medical Sciences, Hapur, Uttar Pradesh.

The two groups of drugs are made as:
Group (RD) = 25 Patients receiving 3ml Intrathecal Ropivacaine Heavy 0.75% with 0.5ml Dexmedetomidine (5mcg), Total volume 3.5ml Group (BD) = 25 Patients receiving 3ml Intrathecal Bupivacaine Heavy 0.5% with 0.5ml Dexmedetomidine (5mcg), Total volume 3.5ml

Inclusion criteria:
1. Patients of asa grade1 and 2
2. Patients age between 18-60 years
3. Patients undergoing elective surgeries of lower limb and lower abdominal surgeries
4. Patients of either gender

Exclusion criteria:
1. Patients with any contraindication of spinal anaesthesia
2. Patients posted for lower segmental caesarean section

We will conduct this study in patients undergoing lower abdomen and lower limb surgeries under spinal anaesthesia.50 patients will be divided in two groups of 25 number. Patients were allocated to receive either 3ml (22.5mg) of 0.75% Ropivacaine heavy with 5mcg Dexmedetomidine 0.5ml or 3ml of 0.5% Bupivacaine heavy (15mg) with 5mcg 0.5ml Dexmedetomidine intrathecally by slip in a box technique Drug sensitivity test was done a night before surgery.

Group1RD = 25 patients received 3ml Intrathecal Ropivacaine Heavy 0.75% with 0.5ml Dexmedetomidine (5mcg), Total volume 3.5ml Group 2 BD = 25 patients receiving 3ml Intrathecal Bupivacaine Heavy 0.5% with 0.5ml Dexmedetomidine (5mcg), Total volume 3.5ml.

All patients were familiarized with Visual Analog Scale (VAS) a day prior to surgery and it's use for measuring the postoperative pain. They were advised for fasting for 8 hours and received tablet Alprazolam 0.5 mg as premedication a night before surgery.

After receiving the patient in operation theatre, electrocardiogram, noninvasive blood pressure and pulse oximeter were be attached and baseline parameters were noted.An intravenous line was established with 18G intravenous cannula in large peripheral vein of hand and pre loading was done with ringer lactate (RL) solution 10ml per kg body weight which was infused over 15 minutes. Anaesthesia machine, air-way equipment were checked and drugs for resuscitation and general anaesthesia were made ready before starting the procedure

Under strict aseptic precautions, a 25G Quincke's spinal needle was introduced in sitting position with midline approach into L4-L5 interspace and after confirming free flow of cerebrospinal fluid, drug was injected over 20 seconds with cephalic orientation of the spinal needle bevel. At the end of the injection, a small sterile dressing was applied at the injection site, and patients is placed supine with a pillow under the head and neck soon after the administration of intrathecal drug. Verbal communication with the patient was maintained after spinal anaesthesia.Heart rate, blood pressure, oxygen saturation and respiratory rate were monitored and recorded throughout the intraoperative period after the block ,every 5 minutes for 30 minutes then every 10 minutes for next 1 hour, then every 20 minutes up to completion of surgery.

The level of sensory blockade was evaluated at 3,5,10,15,20and30mins and thereafter at 15 min interval. The sensory block level is evaluated with **pin prick test** and the onset of sensory block is defined as the time between injection of intrathecal drug to the absence of pin prick sensation at T10 level.

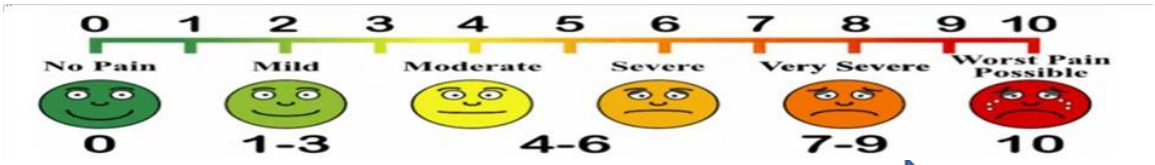
Motor block is evaluated with the **Bromage scale**.
Bromage scale: 0 – no motor block, 1 – inability to raise extended leg, able to bend knee, 2 – inability to bend the knee, can flex ankle; 3 – no movement

Time for motor block onset is defined as time between injection of intrathecal drug till Bromage scale of 3. Complete motor block recovery will be assumed when Bromage score is zero 0.

Duration of sensory block is defined as time interval between injection of intrathecal drug till regression to S1 dermatome. The duration of motor block is defined as the time interval between injection of intrathecal drugs and the recovery of complete motor function (bromage 0).
Post op analgesia effect will be determined by Vas score which is measured between 0 and 10.
(0 = no pain, 10 = most severe pain)

Time from injection of intrathecal drug to vas score more than 4 is considered as Duration of Analgesia. The rescue analgesia was given in the form of injection Paracetamol (1gm) IV infusion at when VAS >4. Scale of 4 and the time of administration is noted for , "time of rescue analgesia"

All patients were observed for any side-effects like nausea, vomiting, pruritus, fall in oxygen saturation, hypotension, bradycardia, sedation and urinary retention or any other adverse effect in the intra and post operative periods and was treated properly.



RESULTS

	GROUP RD	GROUP BD
TIME OF ONSET OF SENSORY BLOCK (IN MINS)	4.8±1.29	3.76±1.05
TIME OF ONSET OF MOTOR BLOCK(IN MINS)	11.24±2.66	6.08±1.63
TIME OF RESCUE ANALGESIA(VAS 4)	430.4±19.34	482.28±38.64
DURATION OF SENSORY BLOCK(IN MINS)	416.56±17.007	472.96±38.09
DURATION OF MOTOR BLOCK(IN MINS)	393.2±19.64	454.8±38.01

ADVERSE EFFECTS	Group RD	Group BD
Yes	0	1
No	10	9

HEART RATE(BEATS PER MINUTE)	GROUP 1 RD (Mean±SD)	GROUP 2 BD (MEAN±SD)
BASELINE	78.64±6.56	81.2±8.20
3 MIN	77.72±6.40	76.76±6.75
5 MIN	77.88±5.19	73.60±7.73
10 MIN	78.32±4.34	69.52±7.83
15 MIN	76.96±4.55	68.52±7.08
20 MIN	77.40±5.43	66.72±7.39
30 MIN	78.68±5.92	67.16±7.27

V. Results:

There was no significant difference between groups regarding demographic characteristics and type of surgery. The time of sensory onset was prolonged(4.8 ±1.29 mins) for RD and (3.76±1.05mins) for BD.The time of motor block onset was prolonged for group1 (RD)(11.24±2.66mins) as compared to group (BD)(6.08±1.63mins).The total duration of sensory blockade for RD(416.56±17.007mins)as compared to BD(472.96±38.09mins),duration of motor blockade for RD(393.2±19.64mins) and for BD(454.8±38.01mins) and time for rescue analgesia were significantly prolonged in Group (RD)(430.4±19.34mins) compared to Group (BD)(482.28±38.64mins). There was no significant difference in hemodynamic variables although Group BD had lower Heart Rate (HR) than Group RD.

VI. Conclusion:

This study reveals that hyperbaric ropivacaine with dexmedetomidine provides adequate anaesthesia for all lower abdominal and lower limb surgeries under spinal anaesthesia.

Ropivacaine Heavy with dexmedetomidine achieves a lesser duration of sensory and motor blockade as compared with Bupivacaine heavy with dexmedetomidine.

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